APPLICATION		
DASH NO.	NEXT ASSY	USED ON
01XX	069301-0001	MK20
01XX	069301-0101	MK20
02XX	069301-0002	MK20
02XX	069301-0102	MK20

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	REPLACES REV A. DOCUMENT CONVERTED TO WORD. SH1-REVISED APPL BLOCK . SH6-REVISED TABLE. SH10-REVISED CABLE SET TABLE. ADDED **NOTE . PER ECN 49069. 970529 BL CLAY	5-30-97	Daryl Goodwin

* FIGURE 1 & 2 MAGNETIC MEDIA

REVISION	B
SHEET NO.	1-10

CONT. NO. DTFA01-91-C-00035	WILCOX ELECTRIC, INC. KANSAS CITY, MISSOURI

DRAWN/CHECKED BY PT/CTS	960117
E.E. APPROVAL DARYL GOODWIN	960405
M.E. APPROVAL C.T.STATEN	960405
T.E. APPROVAL F. COON	960411
Q.A. APPROVAL N. PHAM	960405
CONF. MGMT. P.THOMPSON	960307

TEST PROCEDURE: PRODUCTION TEST CABLE SET

SIZE	CAGE CODE	DWG NO.	REV
A	65597	TP 069301	B

SCALE		SHEET
NONE	FSC	1 OF 10

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1. SCOPE

This test is to be used to calculate and cut the electrical phase length of the Heliax cable sets used on the MK20 ILS antenna system.

2. NOTES

None

3. APPLICABLE DOCUMENTS

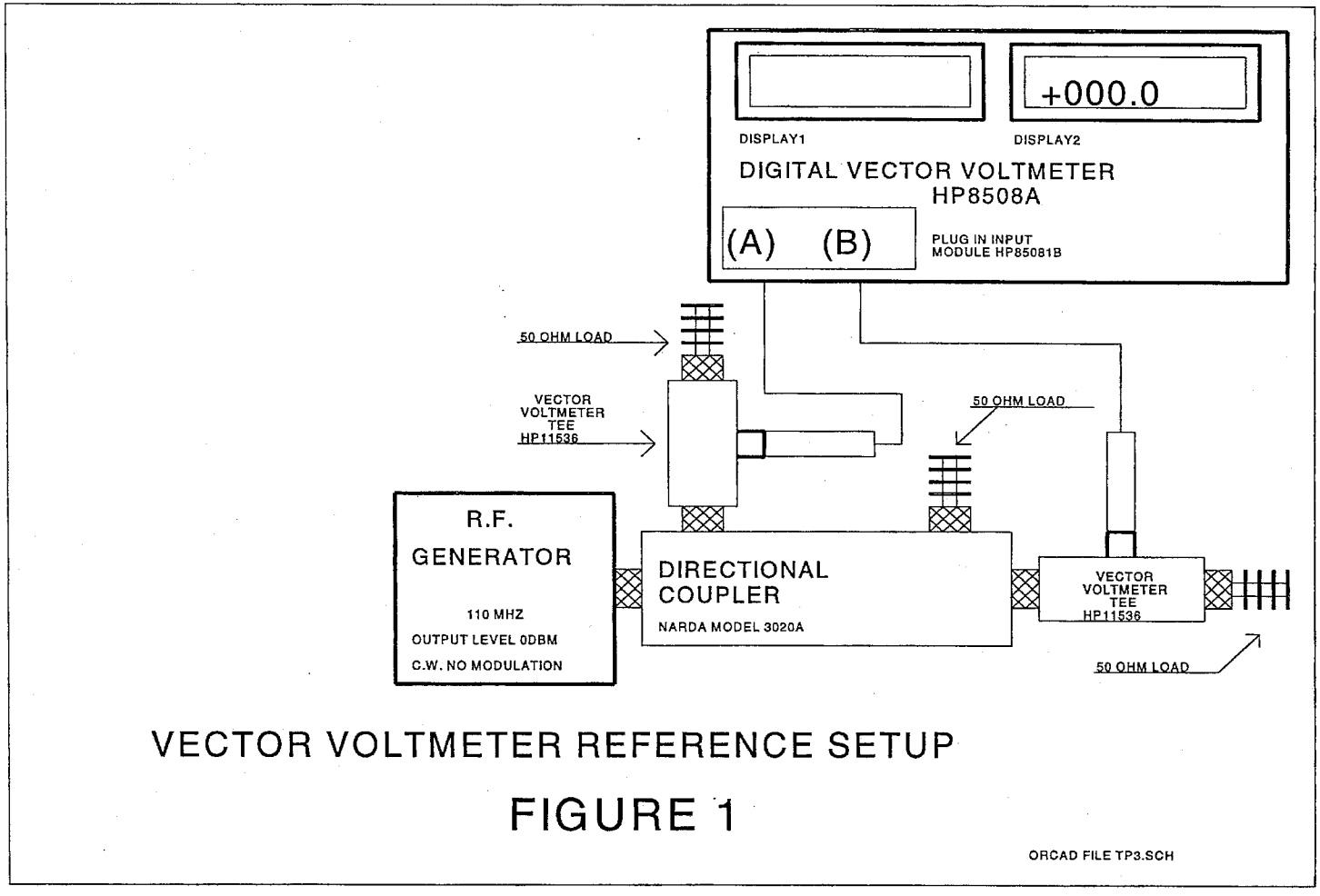
None

4. REQUIRED EQUIPMENT

The following test equipment or equivalent is required: Verify that calibration dates for the test equipment have not expired.

1 ea	HP8508A digital vector voltmeter.
1 ea	HP85081B plugin input module (100K to 1GHz)
2 ea	HP11536A vector voltmeter tee type-N.
3 ea	50 ohm termination. >1/4W, >36 dB return loss at 110 MHz.
1 ea	WPN 875004-0001 Type-N double female adapter.
1 ea	Booton 102A FM-AM signal generator capable of an output frequency of 110MHz with an output level of 0 dB.
1 ea	Narda model 3020A directional coupler.
1 ea	WPN 1291-60023-1 Production test software. Get a copy of the floppy disk from the drawing vault. (TP069301.exe is the executable program file).
1 ea	IBM Compatible PC with monitor and 3.5 inch floppy disk drive for 1.4 meg formatted floppy disk.

5. INTERCONNECT DIAGRAMS



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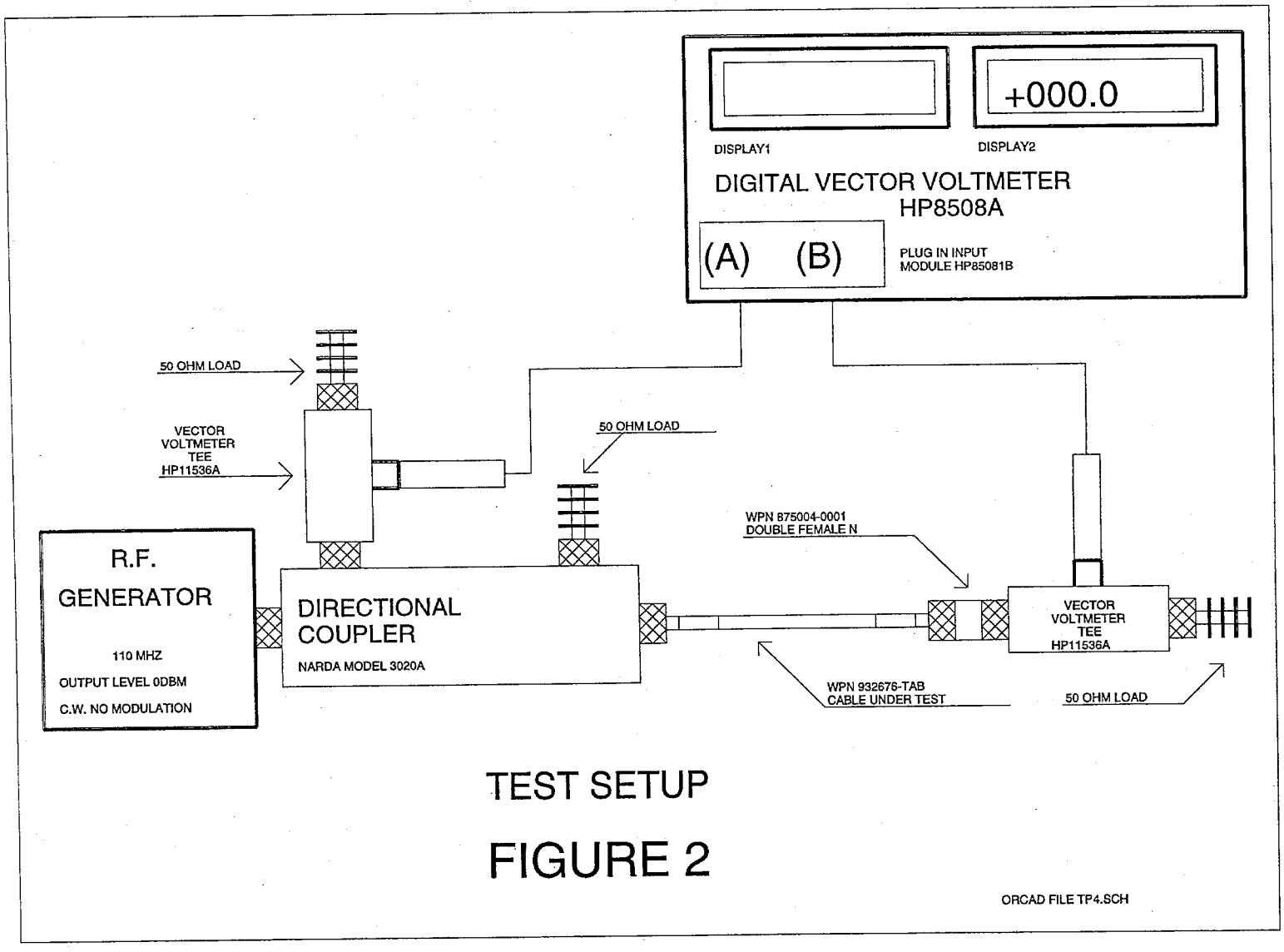

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6. TEST CELL VERIFICATION

6.1 Connect the vector voltmeter, vector voltmeter tee's, RF generator, and 50 ohm loads per Figure 1.

6.2 Set the output of the RF generator to a level less than, or equal to, 0 dBm of output before applying A.C. power.

6.3 Turn power on to the vector voltmeter and the RF generator. Allow time for the equipment to stabilize.

6.4 Determine which cable set will be tested from the following chart and note the test frequency:

CABLE SET 069301-	WPN OF CABLES 932684-	RF PHASE TOLERANCE FOR CABLE SET	TEST FREQ
-0001	-0101 THROUGH -0107 =	0 +/-2.5 DEGREES	110 MHz
	-0108 THROUGH -0114 =	+90 +/-2.5 DEGREES	110 MHz
-0002	-0201 THROUGH -0210 =	0 +/- 2.5 DEGREES	110 MHz
	-0211 THROUGH -0220 =	+90 +/-2.5 DEGREES	110 MHz
-0101	-0115 THROUGH -0128 =	0 +/- 2.5 DEGREES	110 MHz
-0102	-0221 THROUGH -0227 =	0 +/- 2.5 DEGREES	110 MHz
	-0231 THROUGH -0237 =	0 +/- 2.5 DEGRESS	110 MHz
	-0228 THROUGH -0230 =	293 +/- 2.5 DEGRESS	110 MHz
	-0238 THROUGH -0240 =	293 +/- 2.5 DEGRESS	110 MHz

6.5 Set the output frequency of the RF generator to the test frequency listed in the chart +/- 2 KHz

6.6 Set the output level of the RF generator to 0 dBm +/-1 dB or approximately 220 Millivolts, CW operation.

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NOTE:

The following steps will reference the vector voltmeter to a known reference phase prior to starting the Heliax cable phase measurements.

6.7 After AC power up:

(a) Press "B-A phase" button
(b) Press "A" button

on the Vector Voltmeter until only the B-A phase light is ON and all other lights are OFF.

6.8 On the vector voltmeter, press the blue SHIFT button and then the REF button. At this time, the B-A key light and the REF key light should both be ON and all other lights should be OFF. The REL and DEG indications in display window 2 should be ON and the indication in the window should be zero. The display 1 window should be OFF.

(The following indications on the vector voltmeter should be ON, all others OFF).

B-A key light.
REF key light.
REL and DEG in window 2.
Value in window 2 is zero.

7. TEST PROCEDURES

7.1 Configure the test setup per Figure 2.

7.2 Record the Wilcox part number of each cable and the RF phase measurement for that cable. Use the worksheet at the end of this test procedure to record the measurements.

NOTE:

If there are multiple cable sets being tested and cut they might be mixed up, give the worksheet and masking tape markers on the cables a temporary serial number.
If an appreciable amount of time has elapsed between measurements, one of the following steps is suggested to verify the stability of the test setup. Record the reading of the cable in the setup and leave it connected to the setup. When returning to the test cell, verify that the phase measurement on the vector voltmeter has not changed by more then +/-0.3 degrees. If the cables have been removed from the test cell connect one of the previously tested cables to the test cell and verify that the RF phase reading on the vector voltmeter has not changed by more then +/-0.3 degrees. If excessive phase drift is encountered, reconfigure the test cell per Figure 1 and restart the test.

7.3 Configure the test cell per Figure 2. Connect one of the previously tested cables to the test cell and verify that the RF phase measurement on the vector voltmeter has not changed by more then +/-0.3 degrees. If the phase measurement for the cable reading can not be duplicated, the entire test will have to be restarted.

7.4 After all the cables have been tested the first cable tested should be retested to verify that the phase reading has not changed by more then +/-0.3 degrees. This will verify the stability of the vector voltmeter and the RF generator.

7.5 If the Heliax cable cutting program, TP069301.EXE, is not loaded on a PC do so and start the software by typing <TP069301hen press <Enter> at the DOS prompt. The software may be loaded into any directory or it's own subdirectory. Follow the instructions on the screen. Selecting the proper cable set and then enter the RF phase measurements for the tested cable set. Pressing the <Enter> key without first typing a numerical input value will be interpreted by the software as a value of zero. Also you can not back up and correct a value after it is entered. If you make a mistake entering the phase measurements you must re-enter all the values from the beginning.

7.6 When finished entering values, the software will ask if the input is correct.
Enter <Y> for Yes, <N> for No or <Q> to Quit and return to the main menu.

7.7 When the cutting calculations are finished, the program will indicate at the bottom of the screen if the cable set is in or out of tolerance.

If in tolerance:

a. Press <ENTER> to get to the main menu.
b. Press 6 <ENTER> to "Print the Customer Test Data and Signature List."

If out of Tolerance:

a. Press <ENTER> to get to the main menu.
b. Press 5 <ENTER> to "Print the Cable cut list..."

7.8 If out of tolerance, the program will print a cut list of which cables will have to be trimmed and by how much.

7.9 It is suggested that the Customer Test Data Sheet also be printed as a reference and attached to the work sheet from the Production Test Software, step 6. This list will show the measured phase for each cable and will be useful for testing the cables that will have to be cut and retested.

7.10 There will always be one cable on the customer file print list that will show a cut length required of zero. Test this cable to verify that the vector voltmeter and the reading for that cable have not changed by more then +/-0.3 degrees. If so, it is not necessary to retest any of the uncut cables.

7.11 Test the cables that were trimmed. Record the new phase measurement numbers for the trimmed cables on the work sheet.

7.12 Rerun the computer program, enter the phase measurements of the cables that did not need to be trimmed and the new phase measurements of the cables that were trimmed.

7.13 All cables should now be in tolerance and pass the computer test.

8. POST TEST PROCEDURES

Print the computer generated Customer Data Sheet and sign, step 6 on the computer screen selection list. The data sheet will be sent with the cable set to the customer.

END TEST...

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9. WORK SHEET

HELIAX CABLE TEST PROCEDURE TP 069301 WORK SHEET

CHECK WHICH SET	CABLE SET 069301	WPN OF CABLES 932684	RF PHASE TOLERANCE FOR CABLE SET	TEST FREQ
_____	-0001	-0101 THROUGH -0107 =	0 +/- 2.5 DEGREES	110 MHz **
		-0108 THROUGH -0114 =	+90 +/- 2.5 DEGREES	110 MHz **
_____	-0002	-0201 THROUGH -0210 =	0 +/- 2.5 DEGREES	110 MHz **
		-0211 THROUGH -0210 =	+90 +/- 2.5 DEGREES	110 MHz **
_____	-0101	-0115 THROUGH -0128 =	0 +/- 2.5 DEGREES	110 MHz **
_____	-0102	-0221 THROUGH -0227 =	0 +/- 2.5 DEGREES	110 MHz **
		-0231 THROUGH -0237 =	0 +/- 2.5 DEGRESS	110 MHz **
		-0228 THROUGH -0230 =	293 +/- 2.5 DEGRESS	110 MHz **
		-0238 THROUGH -0240 =	293 +/- 2.5 DEGRESS	110 MHz **

TEMPORARY S/N: _____ (* see below)
DATE: _____
TEST TECH: _____

CABLE DASH NUMBER	PHASE READING	PHASE AFTER CUTTING	CABLE DASH NUMBER	PHASE READING	PHASE AFTER CUTTING
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

* If there are multiple cable sets being tested and cut they might be mixed up, give this sheet and masking tape markers on the cables a temporary serial number.

** Max total cut lengths can not exceed 4 feet. See B-932684 Note 8.